

CZM

FOUNDATION EQUIPMENT



EK250



SAVANNAH • GEORGIA • USA



BELO HORIZONTE • MINAS GERAIS • BRAZIL



SÃO PAULO • SÃO PAULO • BRAZIL

THE COMPANY

- CZM has 40 years of know-how in manufacturing of foundation equipment with a wide range of models for the most different applications: Drilled shafts, CFA, driven piles with hydraulic hammers, secant piles, micro piles, anchoring among others.
- CZM has 2 manufacturing facilities, one in Savannah, in the state of Georgia, USA, and another in Contagem, in the state of Minas

- Gerais, Brazil, from where exports for over 25 countries worldwide.
- CZM machine design's priority is quality and after sales and therefore uses base chassis Caterpillar.
- CZM is the largest world manufacturer of CFA drilling rigs thanks to the revolutionary torque mechanism "Bottom Drive CFA", an international known CZM patent.

EK250

Mounted on a CAT336HHP
(High Horse Power). ”



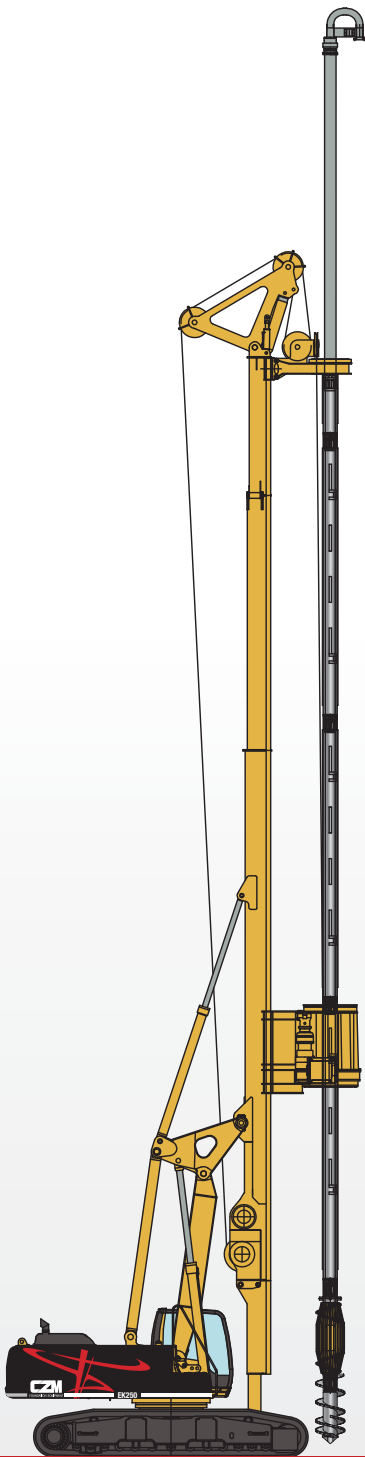
APPLICATION

The EK250 from CZM has been designed for high performance and versatility. It is a reliable drilling rig mounted on a CAT base, keeping the operation and maintenance extremely friendly and efficient.

The EK250 rotary head has the most robust design on the market followed with the biggest inner passage. These features allows the EK250 to deliver higher drilling torque, the use of stronger kelly bars and the versatility of different applications such as

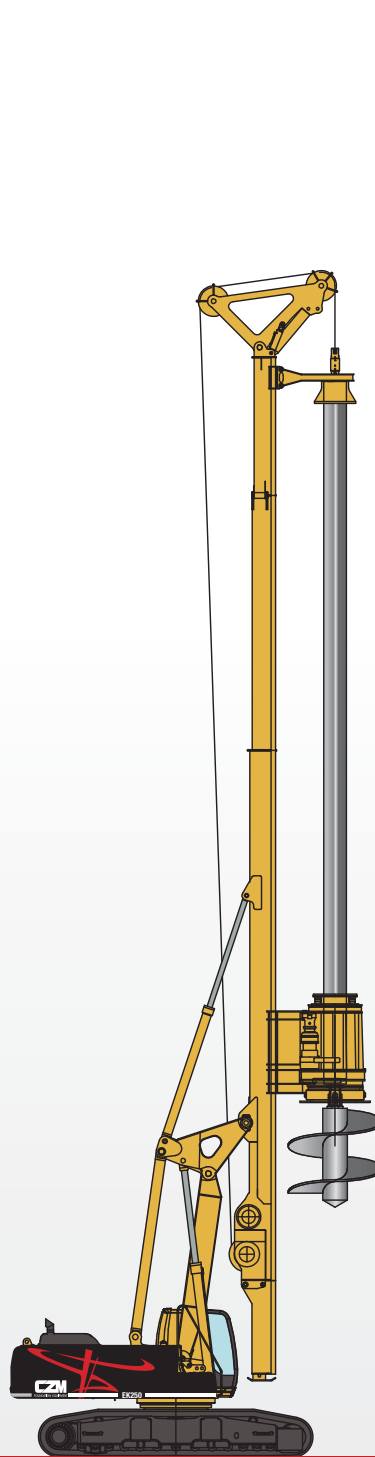
Kelly Bar, CFA and or Full Displacement Pile. There is no need in changing a single hydraulic hose for any of these applications. This is due to the unique patented torque mechanism "Bottom Drive CFA" exclusive of CZM.

With hydraulic extended crawlers, centralized parallelogram and the mast made of a light weight / high yield strength "weldox" steel enables this drilling rig the most stable of its category in the market.



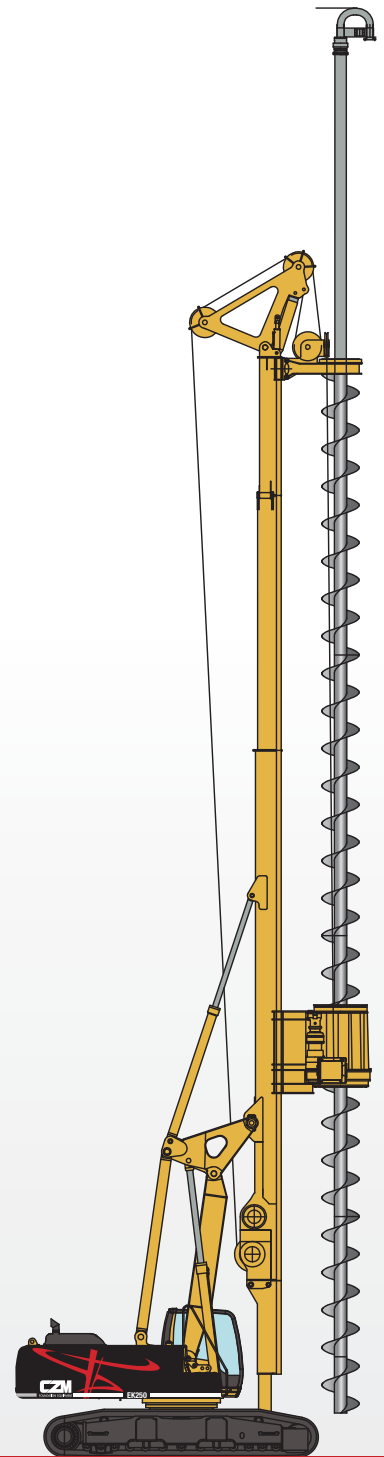
BOTTOM DRIVE FULL DISPLACEMENT PILE

Depth: 88 ft / 27 m
Diameter: 24 in / 600 mm



DRILLED SHAFT PILE

Depth: 246 ft / 75 m
Diameter: 100 ft / 2.540 mm



BOTTOM DRIVE CONTINUOUS FLIGHT AUGER PILE

Depth: 88 ft / 27 m
Diameter: 32 in / 800 mm

TECHNICAL SPECIFICATIONS

KELLY BAR APPLICATION

Drilling Depth (standard version)	159 ft	48 m
Maximum Drilling Depth	246 ft	75 m
Maximum Drilling Diameter (uncased)	100 in	2.540 mm
Maximum Drilling Diameter w/o the mast shoe	138 in	3.500 mm
Maximum Torque	234,500 lbf.ft	318 kN

DIESEL ENGINE (CAT® C9 ACERT™)

Net Power	350 hp	261 kW
Displacement	537 in ³	8,8 L
Fuel tank	164 gal	620 L

HYDRAULIC SYSTEM

Main circuit pressure (max.)	5,076 psi	350 bar
Main circuit Flow rate (max.)	127 gal/min	480 L/min
Auxiliary circuit flow rate (max.)	29 gal/min	108 L
Hydraulic oil tank (CAT + additional)	67.4 gal	255 L

ROTARY HEAD

Maximum torque	234,500 lbf.ft	318 kN
Working Speed (maximun torque)	7 rpm	7 rpm
Working speed	8-23 rpm	8-23 rpm
Spin off speed	35-98 rpm	35-98 rpm
Hydraulic motor	2 x Linde	2 x Linde
Reducer	2 x Brevini	2 x Brevini

MAIN WINCH

Maximum pull-force (1st layer)	69,049 lbf	307 kN
Maximum pull-force (2nd speed)	49,207 lbf	219 kN
Line speed (1st layer)	176 ft/min	54 m/min
Maximum line speed (2nd speed)	262 ft/min	80 m/min
Cable diameter	1.1/8 in	-
Drum diameter (1st layer)	22.5/16 in	566 mm
Hydraulic motor	1 x Linde	1 x Linde
Reducer	1 x Brevini	1 x Brevini

AUXILIARY WINCH

Maximum pull-force (1st layer)	23,332 lbf	104 kN
Cable diameter	3/4 in	19 mm
Drum diameter (1st layer)	16.5/8 in	423 mm
Hydraulic motor	1 x Linde	1 x Linde
Reducer	1 x Brevini	1 x Brevini

CROWD SYSTEM

Cylinder Pull-down force (nominal)	73,326 lbf	326 kN
Cylinder Pull-up force (nominal)	81,814 lbf	364 kN
Cylinder stroke	19 ft 8 in	6.000 mm

UNDERCARRIAGE

Track length	19 ft 3 in	5.880 mm
Length to center of rollers	16 ft 5 in	5.000 mm
Transport position width (retracted)	9 ft 10 in	3.000 mm
Operation position width (extended)	14 ft 1 in	4.300 mm
Track shoes width	31.1/2 in	800 mm
Maximum drawbar pull (effective)	51,930 lbf	231 kN
Maximum travel speed	3.1 mph	5 km/h

MAST INCLINATION

Backward	15°	15°
Forward	5°	5°
Sideways	7,5° / 7,5°	7,5° / 7,5°

TRANSPORT

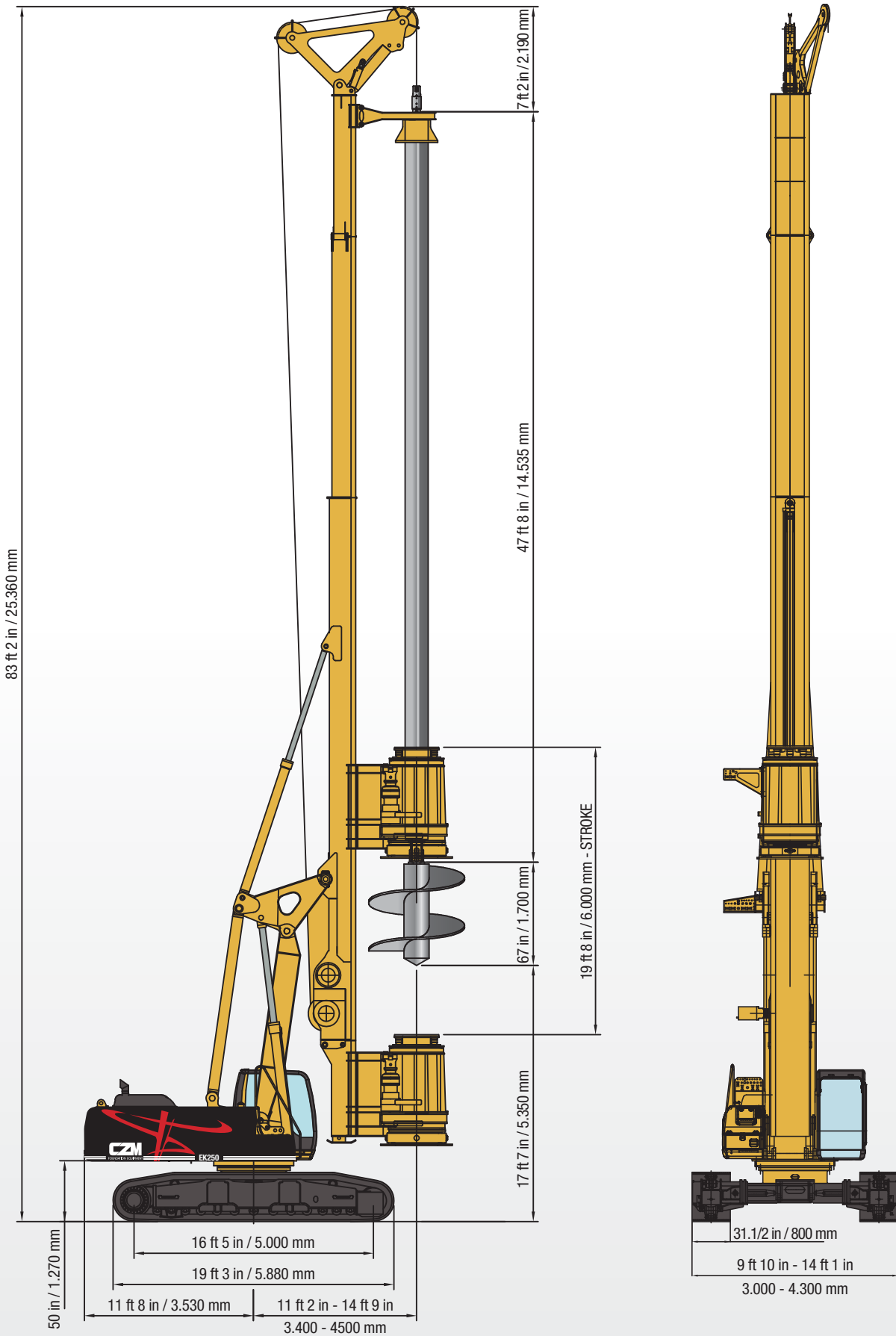
Overall Height	10 ft 10 in	3.295 mm
Transport Length	64 ft 6 in	19.670 mm
Transport Width	9 ft 10 in	3.000 mm
Transport Weight	159,174 lb	72.200 kg

GENERAL DATA

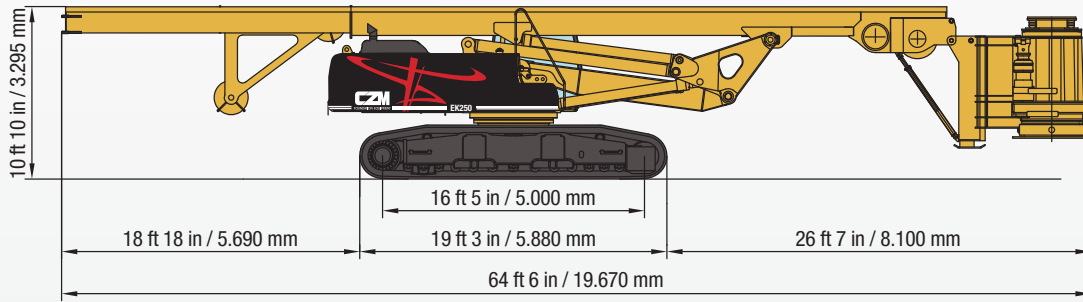
Overall height	83 ft 2 in	25.360 mm
Operation weight	176,350 lb	80.000 kg
Ground pressure	14,2 psi	1 kg/cm ²

Specifications based on Caterpillar base.
Specifications are subject to change without notice.

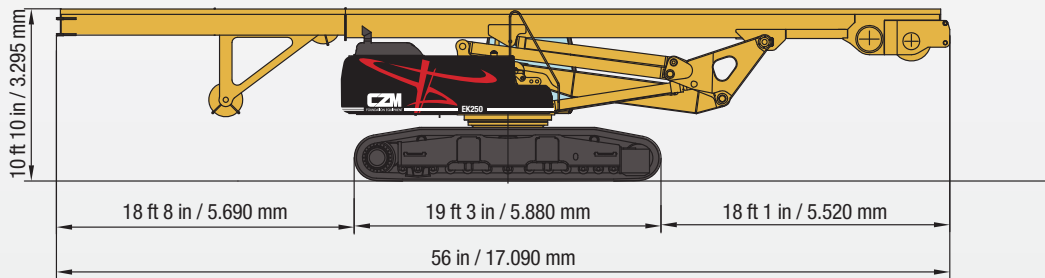
GENERAL DIMENSIONS



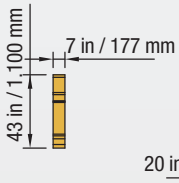
TRANSPORT POSITION



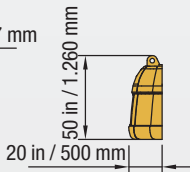
Weight: 159,174 lb / 72,200 kg



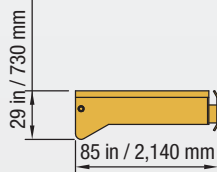
Weight: 112,500 lb / 51,000 kg



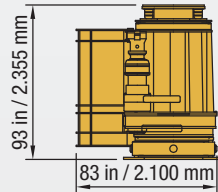
Weight: 7,000 lb
3,200 kg



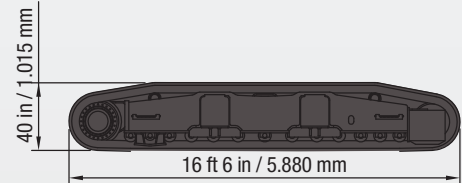
Weight: 18,700 lb
8,500 kg



Weight: 3,700 lb
1,700 kg



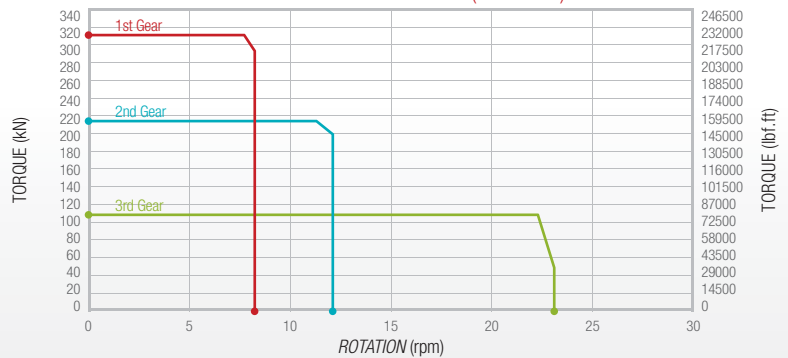
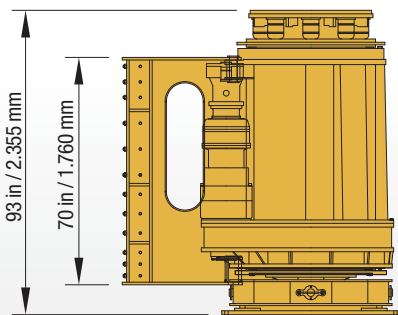
Weight: 17,600 lb
8,000 kg



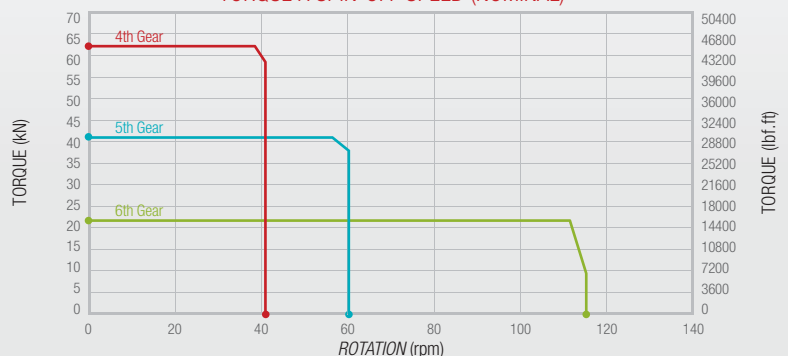
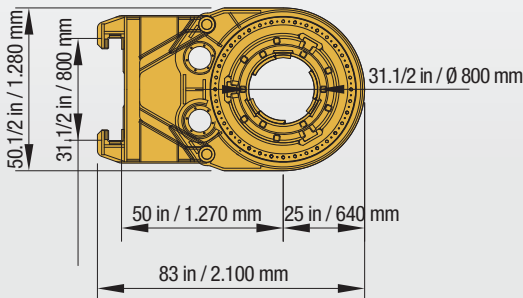
Weight: 2 x 15,400 lb
2 x 7,000 kg

ROTARY / TORQUE DIAGRAM

TORQUE X WORKING SPEED (NOMINAL)



TORQUE X SPIN-OFF SPEED (NOMINAL)



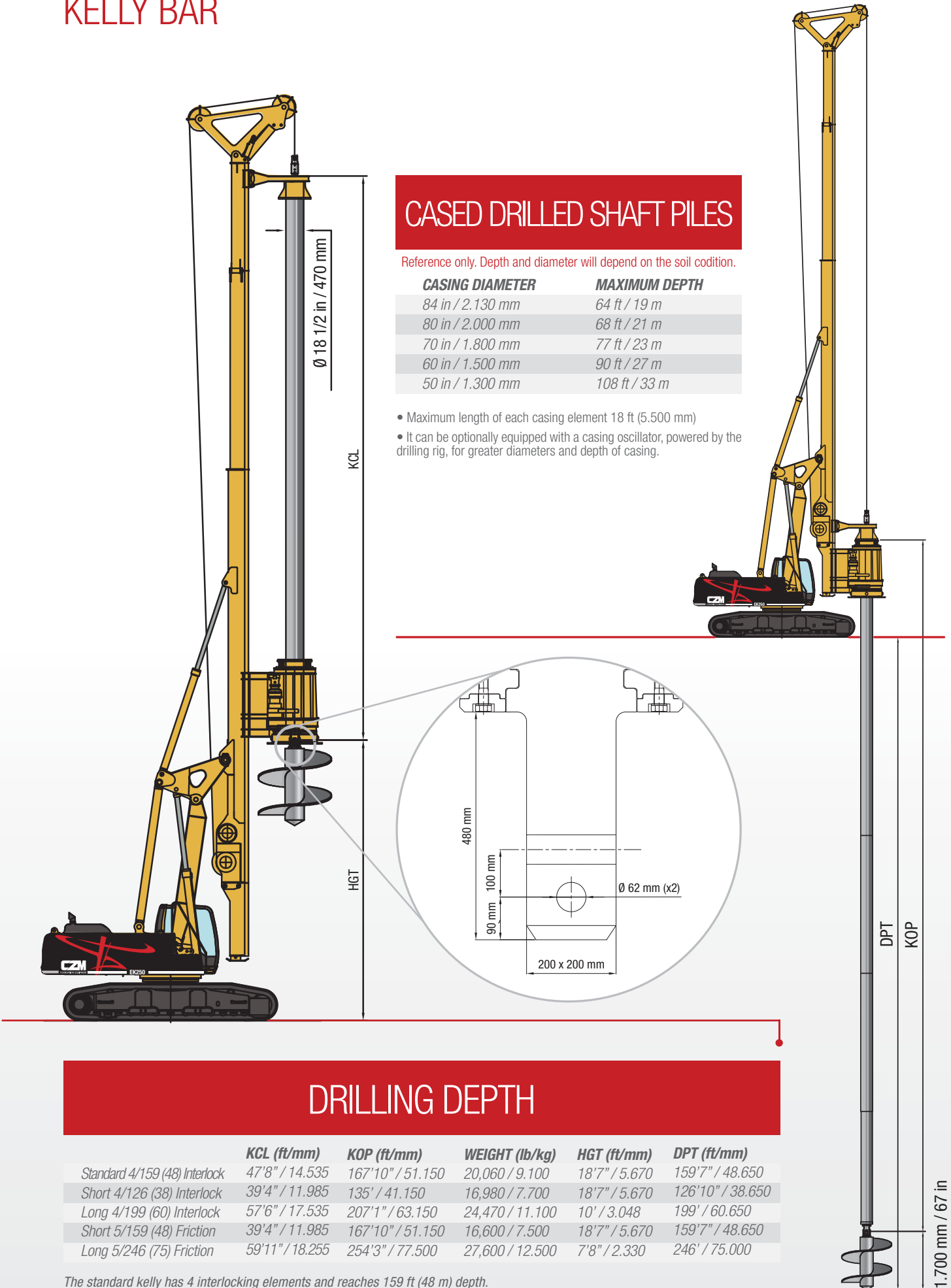
KELLY BAR

CASED DRILLED SHAFT PILES

Reference only. Depth and diameter will depend on the soil condition.

CASING DIAMETER	MAXIMUM DEPTH
84 in / 2.130 mm	64 ft / 19 m
80 in / 2.000 mm	68 ft / 21 m
70 in / 1.800 mm	77 ft / 23 m
60 in / 1.500 mm	90 ft / 27 m
50 in / 1.300 mm	108 ft / 33 m

- Maximum length of each casing element 18 ft (5.500 mm)
- It can be optionally equipped with a casing oscillator, powered by the drilling rig, for greater diameters and depth of casing.



DRILLING DEPTH

	KCL (ft/mm)	KOP (ft/mm)	WEIGHT (lb/kg)	HGT (ft/mm)	DPT (ft/mm)
Standard 4/159 (48) Interlock	47'8" / 14.535	167'10" / 51.150	20,060 / 9.100	18'7" / 5.670	159'7" / 48.650
Short 4/126 (38) Interlock	39'4" / 11.985	135' / 41.150	16,980 / 7.700	18'7" / 5.670	126'10" / 38.650
Long 4/199 (60) Interlock	57'6" / 17.535	207'1" / 63.150	24,470 / 11.100	10' / 3.048	199' / 60.650
Short 5/159 (48) Friction	39'4" / 11.985	167'10" / 51.150	16,600 / 7.500	18'7" / 5.670	159'7" / 48.650
Long 5/246 (75) Friction	59'11" / 18.255	254'3" / 77.500	27,600 / 12.500	7'8" / 2.330	246' / 75.000

The standard kelly has 4 interlocking elements and reaches 159 ft (48 m) depth.



- The largest hollow inner passage diameter (31.1/2 in / 800 mm) of rotaries:
 - Higher torque
 - Stronger Kelly Bar
 - Longest durability
- 2 groups of Hydraulic Motor LINDE transmitting 235,500 lbf.ft (318 kN) of torque with the highest starting torque;
- 2 Planetary Gear BREVININI with Power-Shift for spin-off up to 100 rpm;
- 2 Swing Bearings, one at the top and one at the bottom of the rotary;
- Pinions and main gear designed for lifetime operation.

Drilling 138 in (3,5 m) diameter hole on the Darney Bridge Project, WV-USA



- Crowd system performed by a 20 ft stroke hydraulic cylinder;
- Dedicated hydraulic pump, supplying flow to the Crowd Cylinder during the drilling operation, keeping the flow from the main pump exclusively for the rotary and main winch.

The most robust rotary head in the market



- **Interlocking Kelly Bar**
 - Large diameter tubes (18.1/2 in / 470mm);
 - Mix o "Zip-Lock" (interlocking all over the length) and "J-Lock" (notches longer and wider), keeping it easy to lock and unlock and requires less maintenance.



- The parallelogram of the EK250 is an evolution from standard parallelograms. It is centered with the base machine instead of frontal. It allows a much higher attachment to the mast resulting in better stability, buckling length of the mast and better strength for the group.



- 100% of the Hydraulic Power is supplied to the Rotary or the Main Winch;
- 100% of the oil is filtered and goes through Heat Exchanger (including drain lines);
- Extra cooling, anti-shock and anti-cavitation system (extra service pump) for main components.



- The mast is made of special steel called "Weldox" that has a yield strength 2,8 times higher than regular ASTM A36 steel. It means that with less weight the EK250 can have better stability and displacements on the job site and easier transport handlings.



- The main winch is equipped with a heavy duty motor LINDE, with Pulling Force of 69,000 lbf (307 kN) and two speeds (up to 262 ft/mim / 80 m/mim) for higher production;
- The main winch was designed with some features to facilitate the operation and increase cable lifetime:
 - LEBUS GROOVED DRUM: In this system the cables' line do not touch each other sideways allowing a perfect winding;
 - HYDRAULIC BOTTOM HOLE SYSTEM: This feature prevents the cable from losing tension when the tool reaches the bottom of the hole preventing the cable from touching the Kelly bar inner wall while drilling and also help the winding;
 - Better ratio relation between cable and drum diameter (20% over dimensioned according to standards).

- The EK 250 is completely self-erected. The masthead and the mast pin are hydraulic operated from inside the operator cabin for faster set-up.
- The EK250 has excellent weight and transport dimension for easy and quick transportation. It has transport width of 9'11" (3.000 mm) and transport height of 10'10" (3.295 mm). The transport weight of the machines is approximately 145.000 lbs.





FOUNDATION EQUIPMENT



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